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1 SAFETY INSTRUCTIONS

This Manual contains important information about the correct use of the FreeDuck2 pedal assist bike as well as its maintenance and safety.

All users must read and understand the content of this Manual.

To maintain vehicle performance and use it safely for many kilometres, follow the instructions in this manual and carry out all the maintenance and checking procedures described.

Your safety and the safety of others on the road depends on your knowledge of the vehicle and on its condition, so:

- *Read this manual carefully before using the vehicle. Familiarise yourself with the vehicle in open areas with no traffic.*
- *Respect the laws in force in your country and use the vehicle only where permitted.*
- *Check your country's Traffic Code regarding the use of pedal assist bikes.*
- *Always use a helmet and tight-fitting clothing. Do not wear loose garments such as scarves or coats that might get caught in moving parts of the vehicle. Use light-coloured and reflective clothing at night.*
- *Do not ride the vehicle if you are under the influence of alcohol or drugs that might alter your perception or make you sleepy.*
- *Do not let inexperienced people or children drive the vehicle.*
- *Do not use the vehicle if it or its charger do not seem to work properly or if you are uncertain about how to use it. Ask your dealer for advice.*

2 RULES FOR CORRECT USE

FreeDUCk pedal assist bikes are designed to guarantee easy assembly and use with the least maintenance possible. Nevertheless, there are some simple rules to follow to keep your vehicle safe and reliable.

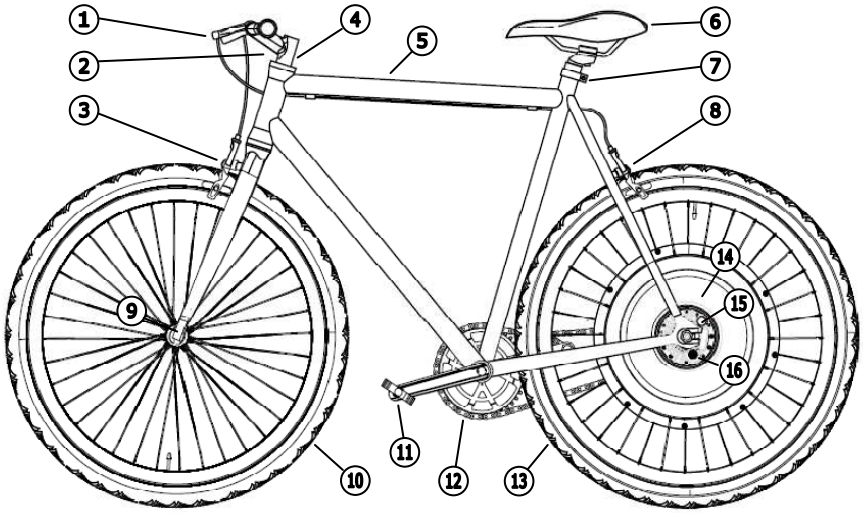
- *Follow the operating and maintenance instructions in this Manual. Misuse or failure to comply with maintenance instructions may lead to serious harm to the rider and others on the road and rapid deterioration of the original performance.*
- *The vehicle is designed to be used on paved and dirt roads. Do not use off-road or for wading.*
- *Do not expose the bike to inclement weather, high temperatures, salt air and acid or corrosive materials/fumes.*

- *Do not modify or adjust in a different manner from what indicated in this Manual. Any intervention on the vehicle by personnel not authorised by DUCATI Energia during the warranty period invalidates said warranty.*
- *Any modifications carried out on the frame, braking system, electrical system or other functional part of the vehicle will be considered as tampering and, in addition to releasing the Manufacturer from any responsibility, will invalidate warranty rights.*
- *The vehicle must be turned off and disconnected from the charger during adjustment and maintenance operations.*
- *Use only original DUCATI Energia spare parts.*

- *No adjustment or maintenance operations must be carried out inside the e-wheel or charger. Do not open or tamper with these components. Risk of short-circuit and electrocution.*
- *Do not use the charger if the cable is damaged, cut or shows signs of wear. Replace it immediately.*

3 VEHICLE DESCRIPTION

3.1 Main components



1. Brake lever
2. Handlebar adjustment
3. Front brake
4. Steering direction adjustment
5. Aluminium frame
6. Seat
7. Seat height adjustment collar
8. Rear brake
9. Rear wheel quick release
10. Front tyre
11. Pedal
12. Chain ring
13. Rear tyre
14. E-wheel
15. On/Off button
16. Charger Socket

3.2 Technical features

FreeDUCk2 is an innovative pedal assist bike with all the electric and mechanical devices needed for traction built into the rear wheel.

The electric motor provides assistance proportionally to the force exerted on the pedals, which is detected thanks to a sophisticated combined torque/speed sensor. This way, the motor will provide more assistance when needed, for example with standing starts or riding uphill, guaranteeing a smooth and relaxing ride.

When in pedal-assist mode (*see Par. 6.1 on p.11*), the performance of the motor is limited to a top speed of 25 km/h and 250W of power, as prescribed by applicable standards. It is still possible to reach a higher speed, but the power required to do so relies exclusively on the rider's muscle strength.

FreeDUCk2 bicycles can also be used as traditional bikes simply by turning the drive wheel off.

3.3 Technical data

Top speed in pedal assist mode	25Km/h	Frame	Tubular aluminium
Motor continuous power output	250 W	Battery type	Li-ion
Motor type	Brushless	Rated voltage	48 V
Chain ring/cog ratio	46/18	Battery capacity	8.5 Ah
Tyre pressure	5.5 bar	Energy management system	BMS with equaliser
Operating temperature	0/50°C	Total charging time	3 hours

Notes: * *battery and motor performance deteriorate quickly when used outside this temperature range. A such, use in these conditions is not recommended. When the inside temperature of the e-wheel is below -20°C or above 60°C, system operation is inhibited.*

FreeDUCk2 complies with the following Regulations UNI EN 14764, UNI EN 15194, 168/2013/EC.

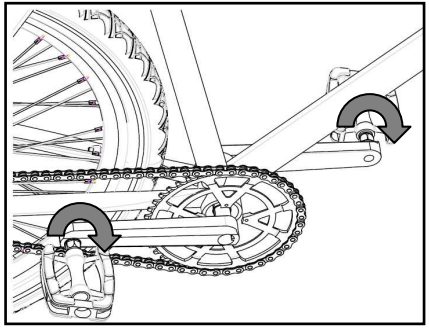
4 ADJUSTMENTS AND CHECKS BEFORE USE

Your FreeDUCk2 bicycle was carefully inspected and tested before delivery irrespective of whether you purchased it from a dealer or online.

In any case, carry out the following adjustments and checks before using it for the first time to make sure that nothing went wrong during transport:

4.1 Preliminary checks

- The first thing to do with your new FreeDUCk2 is to **charge the battery**. To carry out this operation, please refer to indications in Par.5.3 on p.9.
- Check that the **tyre pressure** is 5.5 bar as prescribed. Correct tyre pressure is essential on electric vehicles to guarantee maximum range for each charge and a long battery life.

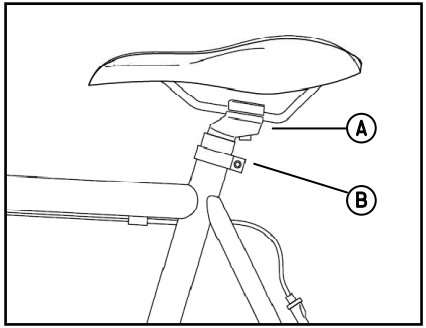


4.2 Mounting the pedals

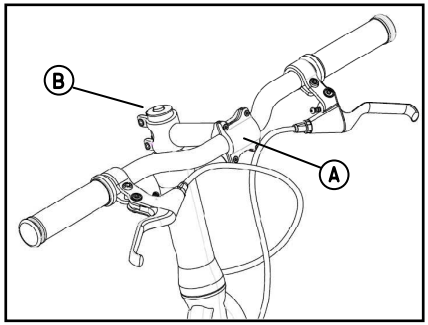
If you purchased your FreeDUCk2 online, it will be delivered with both pedals dismounted. The left and right pedals are different, as their threads are mirrored. You can recognise them by the mark on the axle, located on the side that must be screwed to the crank. The right pedal is marked with an "R" and the left pedal with an "L". Screw the pedals onto their respective cranks - the right one clockwise and the left one anticlockwise. Tighten using a 15mm spanner.

- *It is important to screw the pedals on tightly for safety reasons. The correct tightening torque is 35Nm. If in doubt, ask your dealer.*

4.3 Adjusting the seat



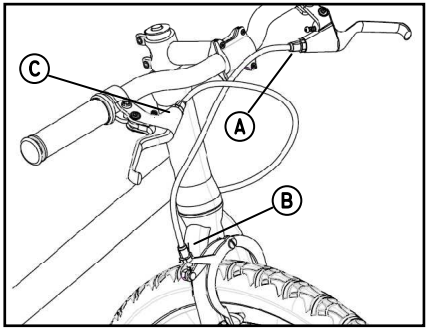
Clamp "A" enables the adjustment of the seat lengthwise, while collar "B" locks the seat tube at the desired height. The seat tube must be at least 8 cm inside the frame and the safety limit engraved on the tube must never be visible.



4.4 Adjusting the handlebar

The handlebar can be adjusted with clamp "A".
Handlebar orientation and height can be adjusted in position "B".

4.5 Adjusting the brakes



To adjust the brakes, use adjuster "B" until the brake pads are next to the rim without touching it. Carry out fine adjustments with adjuster "A". When brake levers are released, the wheel must be completely free. It should start braking when pulling the levers by approximately 2 cm. The figure depicts the rear braking circuit. The same operation must be carried out for the rear brake, though on the rear shoe and on the right lever ("C").

- *Operations must be carried out with suitable tools and tightening the screws completely.*
  Once adjusted, the seat and the handlebar must be secured in place so as not to move even when riding on bumpy roads.
  Inadequate tightening could lead to serious accidents.
- *Contact your dealer if you are not sure you can adjust the bicycle correctly.*

5 BATTERY

5.1 General battery information

FreeDuck2 bicycles are powered by a sophisticated Li-ion battery. This innovative technology guarantees great range, reliability and durability.

The complete battery - composed of different elements connected in series - has a rated voltage of 48 Volt.
The BMS (Battery Management System) is the electronic device that manages and protects the battery from undercharging, overvoltage and overheating during charging and while in use.
In addition, the voltage of battery elements is levelled by an equalisation system that intervenes during the final charging phase. We, therefore, recommend charging the vehicle for an extra hour after it is fully charged (4 hours total) at least once every two weeks.

The battery, BMS and equaliser are all positioned inside the e-wheel and do not require manual maintenance.
The FreeDUCk2 battery has no memory effect and can be charged at any time even if partially charged.

Battery performance refers to a temperature of 20°C. For each degree below this, there will be a 1% drop in performance. This means that if the temperature is 0°, a 20% reduction in bicycle range is to be expected.

- *Any operations or changes on the electrical devices of the bicycle not expressly approved by DUCATI Energia shall invalidate the warranty.*

5.2 Correct battery management

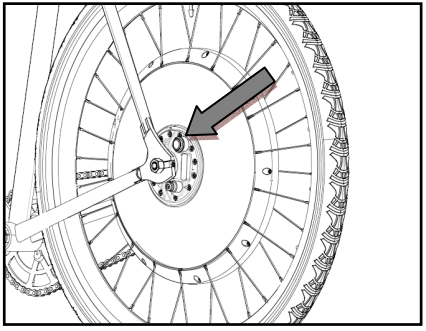
The new vehicle is usually supplied with a 50% charge, so the battery must be fully charged before using it for the first time.

At the beginning, lithium batteries go through a "training" process, which affects future performance and durability. Do not fully discharge the battery during the first 4/5 cycles and do not put the bicycle under too much strain.

To obtain maximum battery performance and maintain your bicycle's features over time, please adhere to the following instructions:

- Fully discharging the battery must be an exceptional event, not the norm. Avoid further discharging the battery once the red light comes on (*see Par. 5.3*).
- Never leave the battery flat for long periods of time. Charge it as soon as possible.
- If you plan on not using the bicycle for a long time, store it away from inclement weather and extreme temperatures and fully charge the battery at least once a month.

5.3 Charging the battery



The battery level is indicated by the light around the power button. Each colour corresponds to a different level:

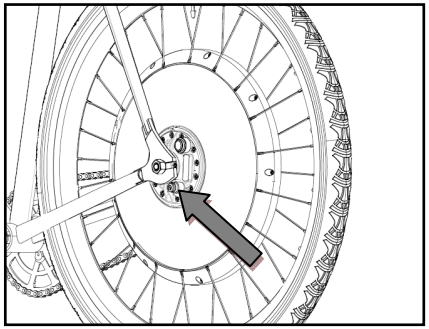
COLOUR	REMAINING CHARGE
GREEN	above 60%
YELLOW	between 30 and 60%
RED	between 15 and 30%
FLASHING RED	below 15%

During the first couple of uses, the light may flash red even after charging. This is due to the BMS self-learning phase, after which the correct level will be shown.

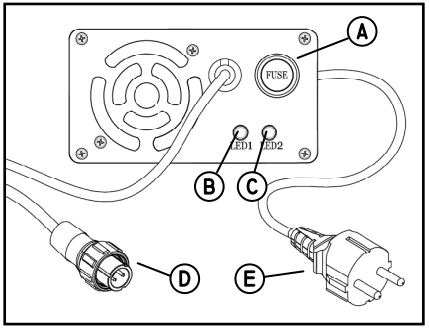
Charging the battery is very easy:

- Put the bicycle in a sheltered environment on a stable support.
- Turn off the e-wheel.
- Wait a few seconds, then connect the charger to the e-wheel.
- Connect the plug to a normal 220V socket.

While under charge, the light on the e-wheel will indicate the level reached. Once charged, disconnect the charger first from the socket, and then from the e-wheel.



5.4 Charger



A	Fuse
B	Power present indicator light
C	Status indicator light
D	Charging connector
E	Plug

There are two indicator lights on the charger. Red light "B" comes on to indicate that power (220V) has been detected when the plug ("E") is connected to the socket.

Light "C" indicates battery status - red during charging and green when fully charged.

If light "B" does not come on after connecting to charger, make that it is indeed connected and working. If so, fuse "A" might be blown and in need of replacement.

If the fuse needs to be replaced, use one with the same amperage. Using the wrong amperage can lead to serious risks, including fire hazard.

The charger must be used sheltered from the elements and not exposed to direct sunlight.
Do not cover the charger when functioning, as doing so will impede cooling and cause damage.
If the internal temperature of the e-wheel is above 45°C (due to exposure to sunlight or intensive use), the battery cannot be charged until the temperature drops below this threshold.

- *Charging the battery with any device that is not the original charger supplied by DUCATI Energia, and connecting any unauthorised electrical devices to the vehicle system can result in serious material and personal damage and cause a fire.*

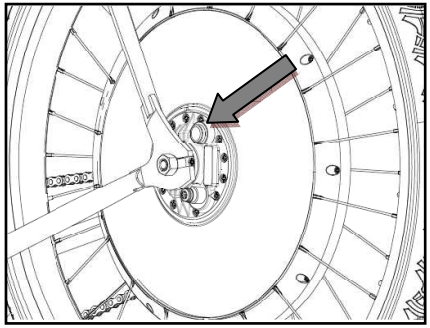
- *Do not use the charger or the cables if they look damaged. The voltage inside the device is dangerous when in use*.

6 USING THE BIKE

Pedal assist FreeDUCk2 bicycles are designed for easy use They can be used both in pedal-assist mode or as traditional bikes simply by turning off the e-wheel.

6.1 Pedal assist mode

In this mode, the electric motor assists pedalling, so cycling is easy and relaxing.
The power supplied by the motor is proportional to the force exerted on the pedals (combined torque-speed sensor), so riding is smooth even when going uphill and starting and stopping continuously, as is the case in city traffic.
The motor supplies up to 250 W power and a speed of 25 km/h, as per the European standards concerning the operation of this type of vehicle. If stronger power is needed (e.g. in case of a very steep climb) or if you are riding at over 25 km/h, the motor keeps running but the extra power must be provided exclusively by the rider's muscle strength.
To activate pedal assist mode, keep the power button pressed for a few seconds. A light will flash and show the colour corresponding to the battery level (*see Par. 5.3 p.9)*.
Once finished, remember to switch off the e-wheel by pressing the same button.



- *It is important to switch the bicycle off when not using it to avoid consuming energy. The e-wheel will turn off automatically after 8 hours of no pedalling.*
- *If the bicycle is subjected to prolonged strain at high temperatures, the thermal protection may trip, inhibiting motor function if the internal temperature rises above 60°C. If the protection trips, turn off the bike and wait for the system to cool down.*

6.2 Unassisted pedalling

To use the bicycle in this mode, simply turn off the e-wheel.
Riding will be similar to a traditional bicycle. If you use the bike in this mode for a long time, make sure to charge the battery at least once every two weeks.
The battery undergoes a slow self-discharging process which could lead to a progressive deterioration and loss of capacity if left uncharged over a long period of time.

7 MAINTENANCE

FreeDUCk2 pedal assist bicycles require little maintenance, but the simple rules described in this chapter must be followed carefully to avoid performance and safety deterioration.

➢ **Tyres**

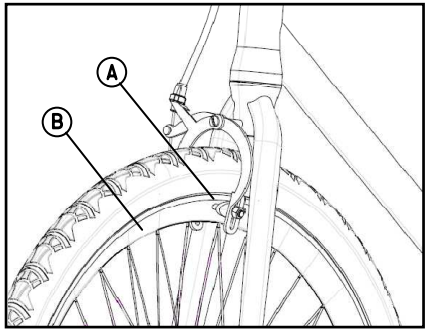
The correct maintenance of tyres is essential for the safety of your vehicle. Tyres in good condition and with the correct pressure are essential on electric vehicles to guarantee maximum range for each charge and a long battery life. Check the pressure and condition of tyres often. The correct pressure is 5.5 bar for both the front and rear tyres.

- *Riding at the wrong pressure damages the tyres, increases energy consumption (therefore reducing range) and the risk of punctures and may cause vehicle reactions that are difficult to control.*

➢ **Battery**

Avoid discharging the battery completely and leaving it flat for long periods of time. Charge for a minimum of 4 hours at least once every two weeks to allow it to equalise. If you plan on not using the bicycle for a long time, charge the battery at least once a month.

➢ **Brakes**

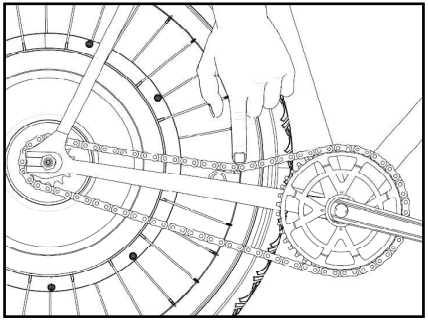


Check the condition and efficiency of brakes after a period of intensive use. When brake levers are released, the wheel must be completely free and should start braking when the levers are pulled by approximately 2 cm.
Using the brakes leads not only to pad ("A") wear but also to progressive deterioration of the rim ring ("B"). Replace worn pads and check that there are no scratches or deep grooves on the rim that may weaken its structure. If there are, replace the rim.
If the brakes become noisy, rubber residues from the pads may have accumulated on the rim. Remove them with a rag and
the specific gentle solvents sold in spare part and accessory stores.

➢ **Front wheel**

Verify that the front wheel does not tilt laterally, indicating the wear of the hub pads. All spokes must be intact and well-tensioned. Fix the pads or spokes immediately if damaged

➢ **Transmission**

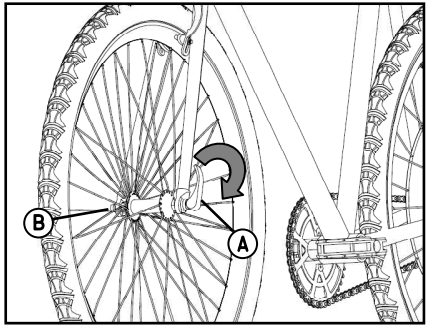


The chain, chain ring and cog must be kept clean and lubricated to prevent dust and dirt from wearing them down quickly.
These components can be washed with gentle solvents using a stiff bristle brush. Once cleaned, they must be dried with compressed air or a rag and lubricated with chain grease. Cover the other parts of the bicycle (drive wheel, frame, rims and tyres) during washing so that they do not come into contact with aggressive substances. Check chain tension: apply light pressure on the central part - it should flex approximately by 15-20 mm.
Chain tension can be adjusted by shifting the drive wheel backwards if it is too loose or forwards if it is too tight (*see Par.8 on p.14*).
Significant chain stretching means that it is worn - replace it.

- *All maintenance and cleaning operations must be carried out with the e-wheel turned off and charger disconnected. Ignoring this instruction could lead to lesions and electrocution.*

8 DISMOUNTING THE WHEELS

It may be necessary to dismount the wheels to replace a tyre or transport the bicycle more easily.



Dismounting the **front wheel** is made easier by the quick release system.

Lower the quick release lever ("A"), loosen the adjustment nut ("B") and extract the wheel by lifting the bicycle.

To remount it, carry out the operations described in reverse order, making sure that the quick release lever is back into its original position (vertical and aligned to the fork) and opposing a certain resistance. If it appears too soft, tighten the nut, whereas if it is too hard, loosen it.

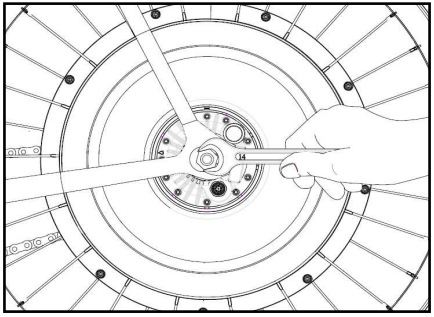
To assess whether it is hard enough, try the following: push the lever upwards with your palm, it should leave a temporary mark on your hand.

- *Riding with a wheel that has not been properly installed is very dangerous. Contact your dealer if you are not sure about the dismounting/remounting operations.*

To dismount the **rear wheel**, simply loosen the nuts of its axle using a 14 mm spanner, move the wheel forward to release the transmission chain and extract the wheel.

When remounting it, make sure that it is perfectly parallel to the frame so that the chain has a 15-20 mm stroke at the centre as indicated on *page 13.*

Tighten both nuts, check the alignment of the wheel to the frame once again (adjust it if necessary) and tighten the nuts very well at 30Nm.



9 STORAGE FOR LONG PERIODS

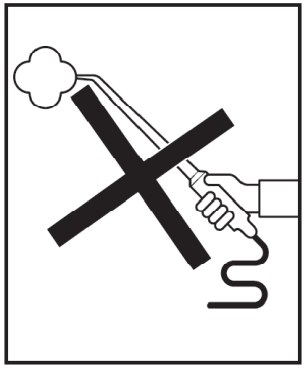
If you are storing the vehicle for long periods of time, please adhere to the following instructions:

- Clean the bicycle carefully, the transmission in particular, and make sure to dry it thoroughly.
- Lubricate the transmission to prevent it from rusting.
- Fully charge the battery.
- Store the bicycle in a sheltered, cool and dry place.
- Store raised from the ground to avoid deforming the tyres.
- Charge the battery at least once a month.

10 WASHING AND CLEANING

Periodical cleaning helps maintain the bicycle in a good and efficient state, enables correct maintenance and makes it easier to notice damage or breakage. To wash the bicycle correctly:

- Do not use high pressure or high temperature jets, but only water, mild detergent and soft, natural sponges.
- Do not use aggressive detergents, solvents or abrasive pastes that could damage varnished or chrome parts.
- Rinse the bicycle with cold, clean, low-pressure water and dry it thoroughly.
- Lubricate the transmission after every wash.
- To remove rubber brake residues on the rims, use a rag soaked with the specific gentle solvents sold in spare part and accessory stores.



- *Wet brakes extend braking distances. After washing the bicycle, ride slowly until the brakes are completely dry.*

11 WARRANTY CONDITIONS

Warranty conditions are described in the "Warranty Certificate" provided at the time of purchase.
The "Warranty Certificate" must be filed for the entire warranty period and, if servicing is requested, it must be given to the dealer. Following the user instructions in this Manual is an essential condition for the warranty to remain valid.

12 TROUBLESHOOTING

Below is a short guide to solving the most common problems that may arise when using the bicycle. It will help you better understand how the vehicle works and to diagnose any faults. If the problem cannot be solved by following the solutions provided, contact your dealer for assistance.

PROBLEM	POSSIBLE CAUSE	SOLUTION
The e-wheel does not turn on.	The battery voltage is below the minimum.	Charge the battery for at least 4 hours.
	The electronic thermal protection has tripped.	Wait for the temperature to drop back down within the acceptable range, then try to turn it back on.
The light flashes red and the motor does not work.	The battery is completely flat.	Charge the battery
Pedal assistance is weaker than usual.	Insufficient tyre pressure.	Restore correct tyre pressure.
	The chain is too tight.	Adjust the chain.
The charger does not charge and the LEDs are off.	Power is not reaching the plug.	Fix the plug.
	The fuse of the charger is interrupted.	Replace the fuse.
	The charger cable is damaged.	Replace the charger.
The charger does not charge, the power LED (red) is on and the status one is always green.	The connector is not connected properly.	Connect the charger to the e-wheel properly.